



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/817,096	04/02/2004	Geon-Ook Park	20067/OPP040601US	2125
34431	7590	09/16/2005	EXAMINER	
HANLEY, FLIGHT & ZIMMERMAN, LLC 20 N. WACKER DRIVE SUITE 4220 CHICAGO, IL 60606			PHAM, LONG	
			ART UNIT	PAPER NUMBER
			2814	

DATE MAILED: 09/16/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/817,096

Applicant(s)

PARK, GEON-OOK

Examiner

Long Pham

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 6-40 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 6-12 and 24-40 is/are allowed.
- 6) ☒ Claim(s) 13-22 is/are rejected.
- 7) ☒ Claim(s) 23 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)             | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. ____   |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date ____  | 6) <input type="checkbox"/> Other: ____                                     |

**DETAILED ACTION**

***Election/Restrictions***

1. Applicant's election without traverse of claims 6-12 and 13-40 in the reply filed on 07/08/05 is acknowledged.

***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 13-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stetter et al. (US publication 2002/0155676) in combination with Toyoda (US publication 2003/0002238) and Ohtani et al. (US patent 6,088,070).

With respect to claim 13, Stetter et al. teach a method for fabricating a semiconductor device, comprising (see figs. 1-16 and associated text):  
forming an interlayer insulating film 20 having a first trench or opening on a substrate 12;  
forming a first electrode 26 of a capacitor within the first trench;  
forming a second trench or opening (see fig. 3) in the interlayer insulating film adjacent to the first electrode to expose a side of the first electrode;  
forming a dielectric layer 30 along inner walls of the second trench; and  
forming a second electrode 44 of the capacitor on the dielectric layer to fill the second trench.

With respect to claims 14, 15, 16, and 17, Stetter et al. fail to teach that each of the first and second electrode has a top view in shape of a comb

having a plurality of recess and concave patterns and the recess patterns of the first electrode are formed face to face with the concave patterns of the second electrode, and the concave patterns of the first electrode are formed face to face with the recess patterns of the second electrode.

Toyoda teaches a device that has a first electrode 31 and a second electrode 32, each of the first and second electrodes has a top view in shape of a comb having a plurality of recess and concave patterns and the recess patterns of the first electrode are formed face to face with the concave patterns of the second electrode, and the concave patterns of the first electrode are formed face to face with the recess patterns of the second electrode. See fig. 1 and [0015].

It would have been obvious to one of ordinary skill in the art of making semiconductor devices to incorporate the teaching of Toyoda into the process of Stetter et al. to attain a desired capacitance between the electrodes with small sizes of the electrodes. see [0015].

With respect to claims 18 and 19, Stetter et al. fail to teach the dielectric layer of the capacitor is made of silicon oxide layer and nitride layer.

Ohtani et al. teach a capacitor dielectric layer having composed of silicon oxide and nitride layers to achieve high dielectric constant. See col. 3, lines 1-5.

It would have been obvious to one of ordinary skill in the art of making semiconductor devices to incorporate the teaching of Ohtani et al. into the process of Stetter et al. to attain the above advantage.

With respect to claim 20, Stetter et al. further teach that the first and second electrodes are formed on the same layer 12. See fig. 9.

With respect to claim 21, Stetter et al. further teach that the first and second electrodes are made of copper. See [0026] and [0030].

With respect to claim 22, Stetter et al. further teach forming the first electrode includes forming a first metal layer 26 on the interlayer insulating film 20

to fill the first trench; and performing chemical mechanical polishing of the first metal layer until a surface of the interlayer insulating film is exposed. See figs. 4 and 5.

***Allowable Subject Matter***

4. Claims 6-12 and 24-40 are allowed.
5. Claim 23 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Long Pham whose telephone number is 571-272-1714. The examiner can normally be reached on M-F, 7:30AM-3:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on 571-272-1705. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Long Pham  
Primary Examiner  
Art Unit 2814

Application/Control Number: 10/817,096

Page 5

Art Unit: 2814

LP